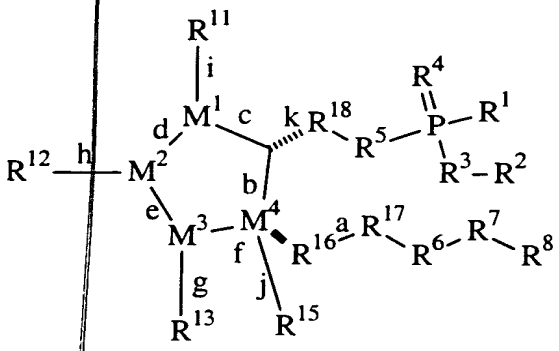
That which is claimed is:

1. A 2-decarboxy-2-phosphinico prostaglandin derivative having a structure selected from the group consisting of:



wherein bond a is selected from the group consisting of a single bond, a *trans* double bond, and a triple bond;

each of bonds b, c, d, e, and f are independently selected from the group consisting of a single bond and a double bond;

each of bonds g, h, i, and j are independently selected from the group consisting of nil, a single bond, and a double bond;

bond k is selected from the group consisting of a single bond and a double bond;

R^1 is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group having 1 to 4 carbon atoms, and a monovalent heterogenous group having 1 to 4 member atoms;

R^2 is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group, a substituted monovalent hydrocarbon group, a monovalent heterogeneous group, a substituted monovalent heterogeneous group, a carbocyclic group, a substituted carbocyclic group, a heterocyclic group, a substituted heterocyclic group, an aromatic group, a substituted aromatic group, a heteroaromatic group, and a substituted heteroaromatic group;

R^3 is selected from the group consisting of an oxygen atom, a sulfur atom, and NH;

R^4 is selected from the group consisting of an oxygen atom and a sulfur atom;

R^5 is a divalent group selected from the group consisting of a hydrocarbon group, a substituted hydrocarbon group, a heterogeneous group, and a substituted heterogeneous group;

R^6 is nil or a divalent group selected from the group consisting of $-CH_2-$, -C(O)- and $-C(R^{10})(OR^{10})-$;

R^7 is nil or a divalent group having the formula $-(CD(D))_p-X-(CD(D))_q-$, wherein p is an integer from 0 to 3 and q is an integer from 0 to 3, X is selected from the group consisting of an oxygen atom, a divalent hydrocarbon group, a sulfur atom, SO, SO_2, and ND, and each D is independently selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group of 1 to 4 carbon atoms, and a monovalent heterogenous group of 1 to 4 member atoms;

R^8 is selected from the group consisting of a hydrocarbon group, a substituted hydrocarbon group, a heterogenous group, a substituted heterogenous group, a carbocyclic group, a substituted carbocyclic group, a heterocyclic group, a substituted heterocyclic group, an aromatic group, a substituted aromatic group, a heteroaromatic group, and a substituted heteroaromatic group;

R^9 is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group of 1 to 4 carbon atoms, and a monovalent heterogenous group of 1 to 4 member atoms;

R^{10} is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group of 1 to 4 carbon atoms, and a monovalent heterogenous group of 1 to 4 member atoms;

M^1, M^2, M^3, and M^4 are each independently selected from the group consisting of a carbon atom and a heteroatom, with the proviso that no two heteroatoms may be adjacent;

R^{11}, R^{12}, R^{13}, and R^{15} are each independently selected from the group consisting of nil, a halogen atom, a heteroatom, and R^2, with the provisos that

optionally, R^{11} and R^{12}, R^{12} and R^{13}, or R^{11} and R^{13} may be bonded together to form a ring structure such as a carbocyclic group, a heterocyclic group, an aromatic group, a heteroaromatic group, a substituted carbocyclic group, a

substituted heterocyclic group, a substituted aromatic group, or a substituted heteroaromatic group,

when R^{11} is OR^9, R^{12} is a hydrogen atom, and M^2 is a carbon atom; R^{13} is not a hydrogen atom, OR^9, a monovalent hydrocarbon group of 1 to 4 carbon atoms, a monovalent heterogenous group of 1 to 4 carbon atoms, a substituted monovalent hydrocarbon group of 1 to 4 carbon atoms, or a substituted monovalent heterogenous group of 1 to 4 carbon atoms,

R^{13} is not $N(R^9)(OR^9)$ when bond g is a single bond and R^{13} is not NOR^9 when bond g is a double bond, and

R^{13} is not OR^9 when R^{11} is OR^9; M^1, M^2, M^3, and M^4 are each carbon atoms, and R^{12} is a hydrogen atom;

R^{16} is selected from the group consisting of $-CH_2-$, -NH-, and $-NR^{19}-$, wherein R^{19} is selected from the group consisting of hydrocarbon groups, substituted hydrocarbon groups, heterogenous groups, and substituted heterogenous groups; with the proviso that R^{19} may optionally be bonded together with R^8 to form a ring structure selected from the group consisting of heterocyclic groups and substituted heterocyclic groups;

R^{17} is selected from the group consisting of $-SO_2-$, C(O)-, and $-CH_2-$;

R^{18} is selected from the group consisting of a sulfur atom and $-CH_2-$; and

an optical isomer of the structure described above, a diastereomer of the structure, an enantiomer of the structure, a pharmaceutically-acceptable salt of the structure, a biohydrolyzable amide of the structure, a biohydrolyzable ester of the structure, and a biohydrolyzable imide of the structure.

2. The derivative of claim 1, wherein R^1 is selected from the group consisting of a hydrogen atom and a monovalent hydrocarbon group.

3. The derivative of claim 2, wherein R^1 is a monovalent hydrocarbon group having 1 to 3 carbon atoms.

4. The derivative of claim 3, wherein R^1 has 1 to 2 carbon atoms.

5. The derivative of claim 4, wherein R^1 has 1 carbon atom.

6. The derivative of claim 2, wherein R^1 is a hydrogen atom.

7. The derivative of claim 1, wherein R^2 is a hydrogen atom.

8. The derivative of claim 1, wherein R^3 is an oxygen atom.

9. The derivative of claim 1, wherein R^4 is an oxygen atom.

10. The derivative of claim 1, wherein R^5 is a hydrocarbon group having 1 to 5 carbon atoms in its chain.

11. The derivative of claim 10, wherein R^5 has a *cis* double bond at position C_5-C_6 position.

12. The derivative of claim 1, wherein R^6 is $-C(R^{10})(OR^{10})-$.

13. The derivative of claim 1, wherein R^7 is selected from the group consisting of $-CH_2O-$, $-CH=CH-$, $-CH=C=CH-$, $-CH_2S-$, $-CH_2CH_2-$, $-CH_2NH-$, $-CH_2NCH_2-$, and $-CH_2O(CH_2)_3O-$.

14. The derivative of claim 1, wherein R^8 is selected from the group consisting of a methyl group, aromatic groups, substituted aromatic groups, heteroaromatic groups, and substituted heteroaromatic groups.

15. The derivative of claim 1, wherein R^{10} is selected from the group consisting of a hydrogen atom and a monovalent hydrocarbon group of 1 to 4 carbon atoms.

16. The derivative of claim 1, wherein bond a is selected from the group consisting of a single bond and a *cis* double bond

17. The derivative of claim 1, wherein 0 to 1 of bonds b, c, d, e, and f is a double bond.

18. The derivative of claim 1, wherein bond h is a single bond.

19. The derivative of claim 1, wherein bond k is a single bond.

20. The derivative of claim 19, wherein one of M^1, M^2, M^3, and M^4 is a heteroatom.

21. The derivative of claim 19, wherein M^1, M^2, M^3, and M^4 are each carbon atoms.

22. The derivative of claim 1, wherein R^{12} is a hydrogen atom.

23. The derivative of claim 1, wherein R^{11} is selected from the group consisting of a hydrogen atom, an oxygen atom, and OR^9.

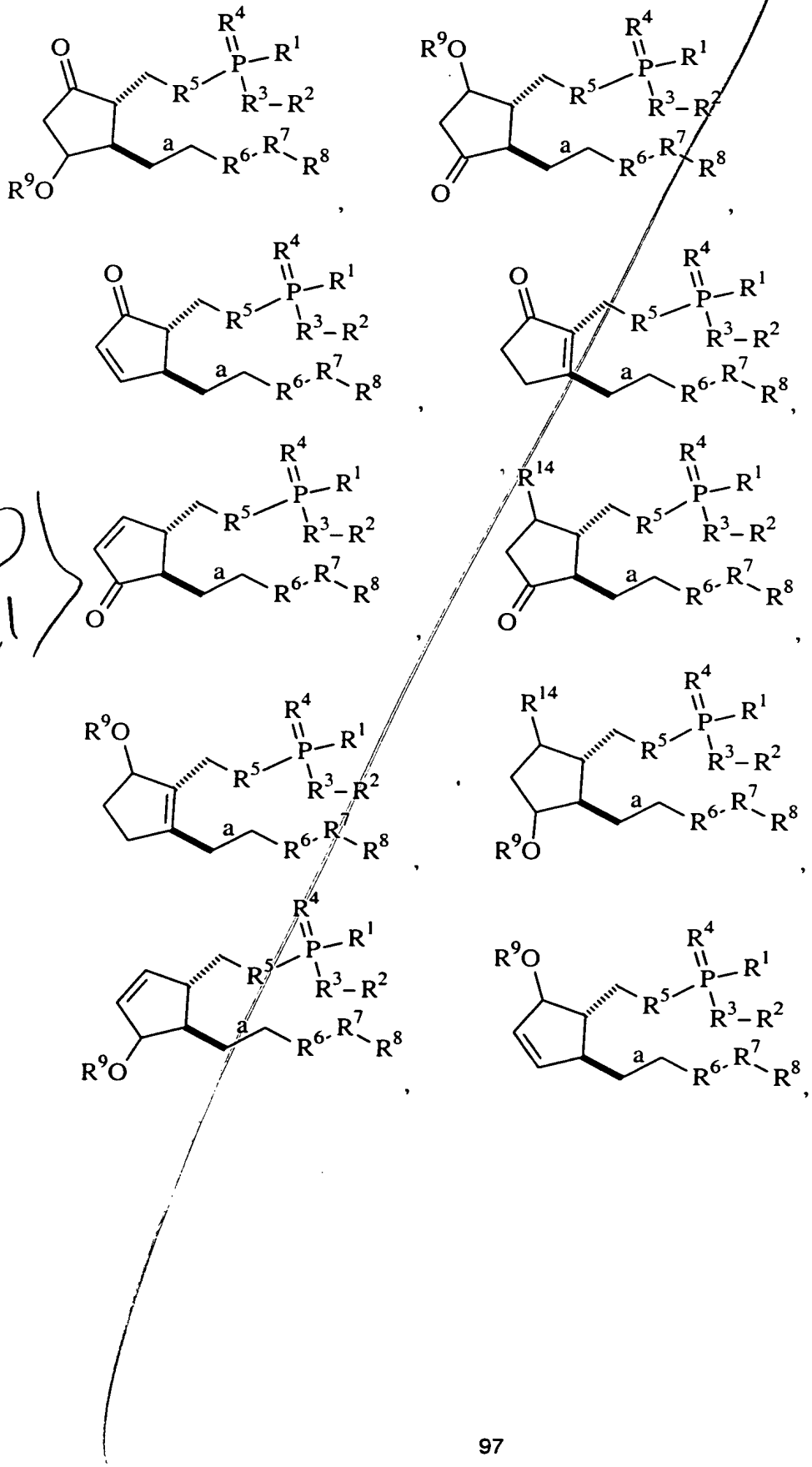
24. The derivative of claim 1, wherein R^{13} is selected from the group consisting of a hydrogen atom, an oxygen atom, and OR^9.

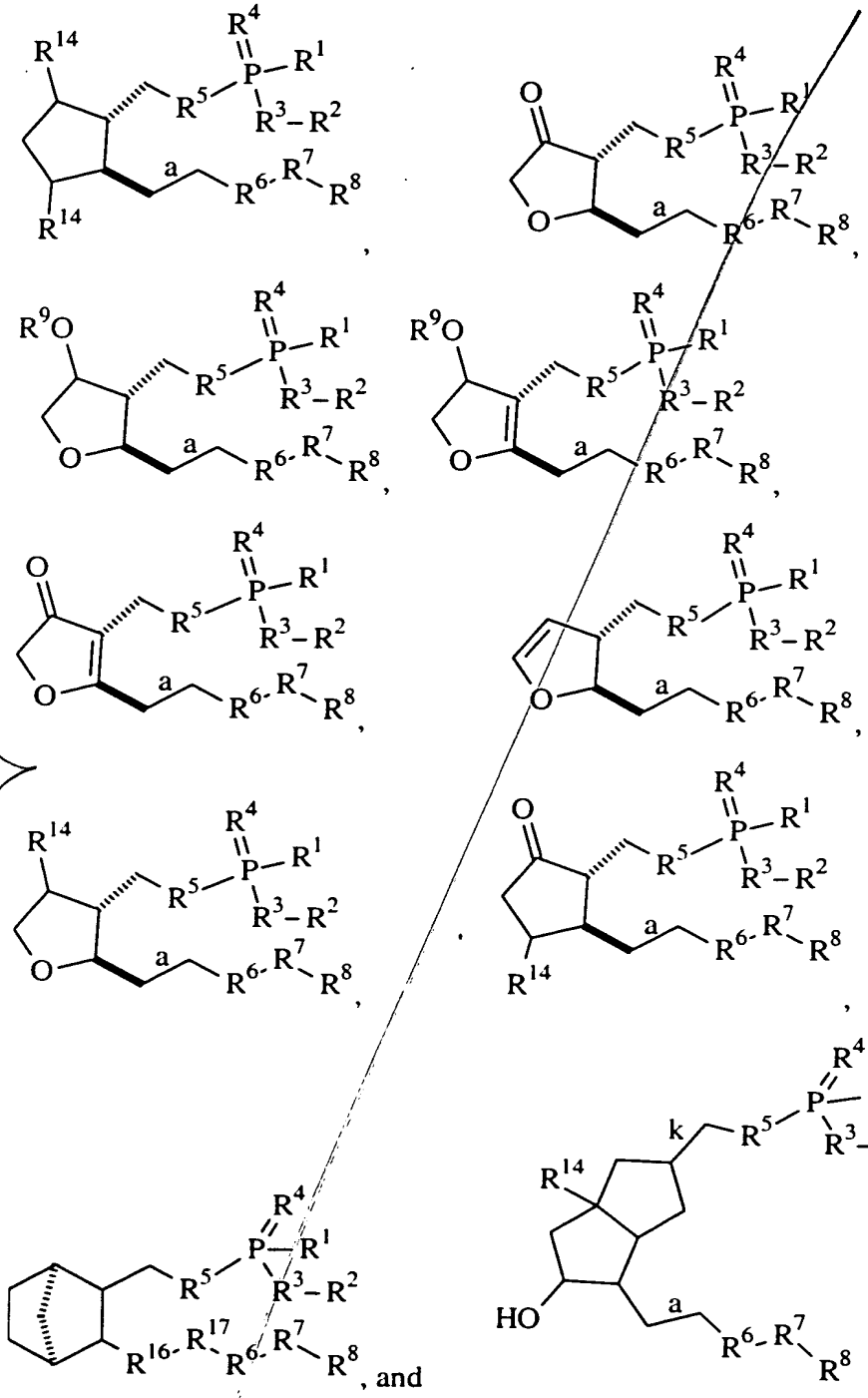
25. The derivative of claim 1, wherein R^{16} is $-CH_2-$.

26. The derivative of claim 1, wherein R^{17} is $-CH_2-$.

27. The derivative of claim 1, wherein R^{18} is $-CH_2-$.

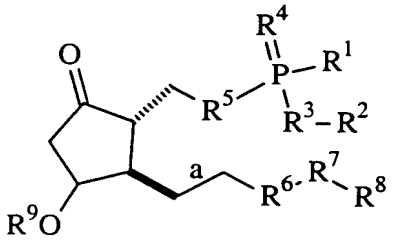
28. The derivative of claim 1, wherein the derivative has a structure selected from the group consisting of:





wherein R^{14} is independently selected from the group consisting of nil, a hydrogen atom, a halogen atom, a monovalent hydrocarbon group of 1 to 4 carbon atoms, and a monovalent heterogenous group of 1 to 4 member atoms.

29. The derivative of claim 28, wherein the derivative is a prostaglandin E derivative having a structure selected from the group consisting of: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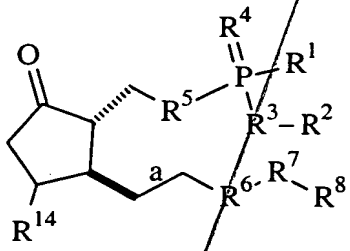
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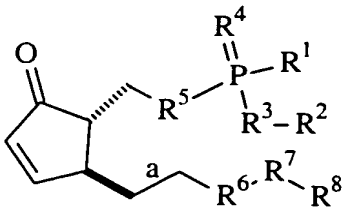
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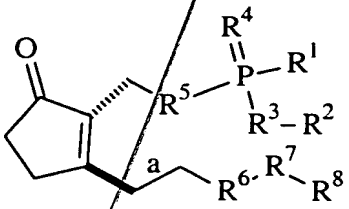
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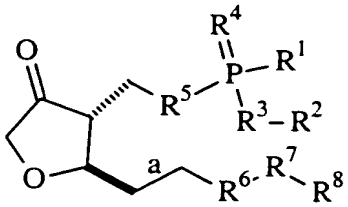
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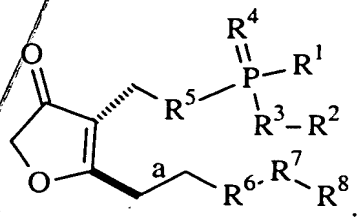
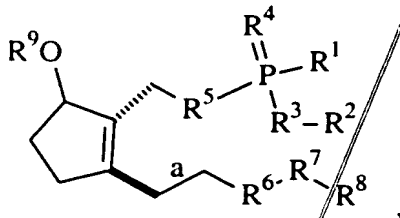

and

30. The derivative of claim 28, wherein the derivative is a prostaglandin F derivative having a structure selected from the group consisting of: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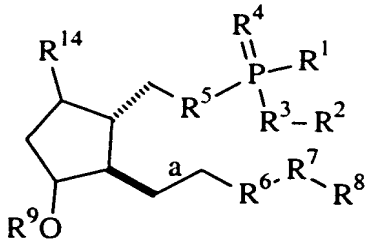
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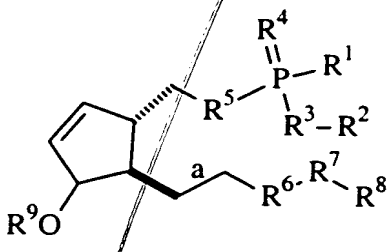
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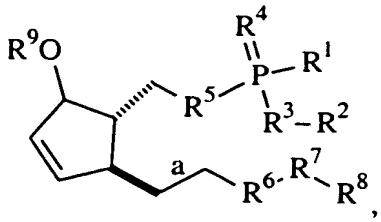
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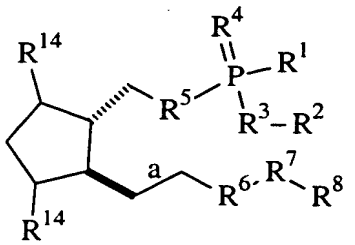
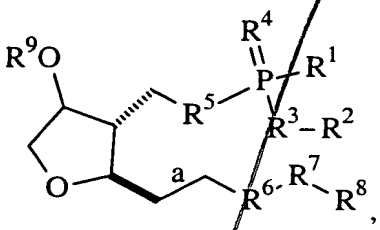
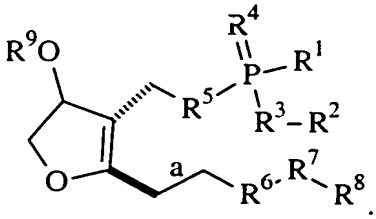
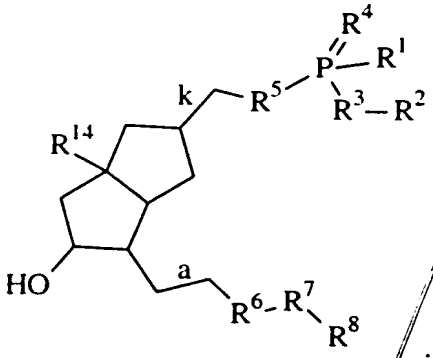


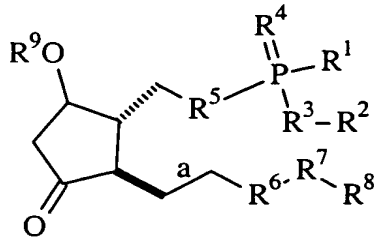




31. The derivative of claim 28, wherein the derivative is a prostaglandin I derivative having the structure:



32. The derivative of claim 28, wherein the derivative is a prostaglandin D derivative selected from the group consisting of:



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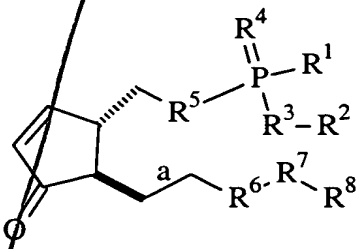
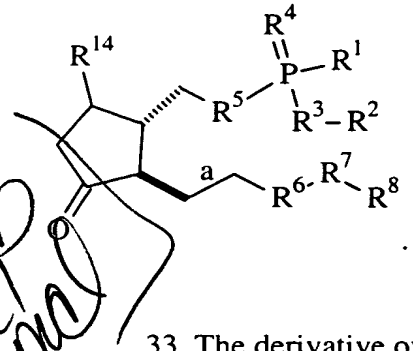
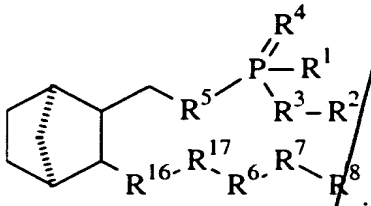


, and

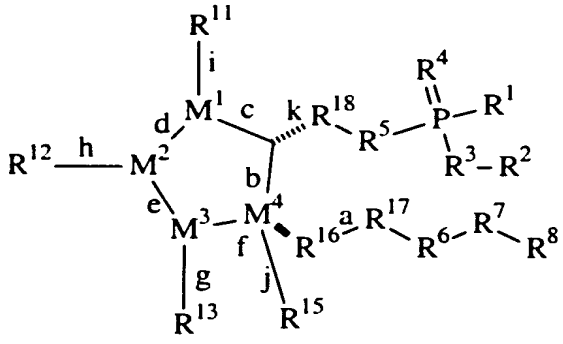


33. The derivative of claim 28, wherein the derivative is a thromboxane having the structure:



34. A composition comprising:

(A) a 2-decarboxy-2-phosphinico prostaglandin derivative having a structure selected from the group consisting of:



wherein bond a is selected from the group consisting of a single bond, a *trans* double bond, and a triple bond;

each of bonds b, c, d, e, and f are independently selected from the group consisting of a single bond and a double bond;

each of bonds g, h, i, and j are independently selected from the group consisting of nil, a single bond, and a double bond;

bond k is selected from the group consisting of a single bond and a double bond;

R^1 is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group having 1 to 4 carbon atoms, and a monovalent heterogenous group having 1 to 4 member atoms;

R^2 is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group, a substituted monovalent hydrocarbon group, a monovalent heterogeneous group, a substituted monovalent heterogeneous group, a carbocyclic group, a substituted carbocyclic group, a heterocyclic group, a substituted heterocyclic group, an aromatic group, a substituted aromatic group, a heteroaromatic group, and a substituted heteroaromatic group;

R^3 is selected from the group consisting of an oxygen atom, a sulfur atom, and NH;

R^4 is selected from the group consisting of an oxygen atom and a sulfur atom;

R^5 is a divalent group selected from the group consisting of a hydrocarbon group, a substituted hydrocarbon group, a heterogeneous group, and a substituted heterogeneous group;

R^6 is nil or a divalent group selected from the group consisting of $-CH_2-$, -C(O)- and $-C(R^{10})(OR^{10})-$;

R^7 is nil or a divalent group having the formula $-(CD(D))_p-X-(CD(D))_q-$, wherein p is an integer from 0 to 3 and q is an integer from 0 to 3, X is selected from the group consisting of an oxygen atom, a divalent hydrocarbon group, a sulfur atom, SO, SO_2, and ND, and each D is independently selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group of 1 to 4 carbon atoms, and a monovalent heterogenous group of 1 to 4 member atoms;

R^8 is selected from the group consisting of a hydrocarbon group, a substituted hydrocarbon group, a heterogenous group, a substituted heterogenous group, a carbocyclic group, a substituted carbocyclic group, a heterocyclic group, a substituted heterocyclic

group, an aromatic group, a substituted aromatic group, a heteroaromatic group, and a substituted heteroaromatic group;

R^9 is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group of 1 to 4 carbon atoms, and a monovalent heterogenous group of 1 to 4 member atoms;

R^{10} is selected from the group consisting of a hydrogen atom, a monovalent hydrocarbon group of 1 to 4 carbon atoms, and a monovalent heterogenous group of 1 to 4 member atoms;

M^1, M^2, M^3, and M^4 are each independently selected from the group consisting of a carbon atom and a heteroatom, with the proviso that no two heteroatoms may be adjacent;

R^{11}, R^{12}, R^{13}, and R^{15} are each independently selected from the group consisting of nil, a halogen atom, a heteroatom, and R^2, with the provisos that

optionally, R^{11} and R^{12}, R^{12} and R^{13}, or R^{11} and R^{13} may be bonded together to form a ring structure such as a carbocyclic group, a heterocyclic group, an aromatic group, a heteroaromatic group, a substituted carbocyclic group, a substituted heterocyclic group, a substituted aromatic group, or a substituted heteroaromatic group,

when R^{11} is OR^9, R^{12} is a hydrogen atom, and M^2 is a carbon atom; R^{13} is not a hydrogen atom, OR^9, a monovalent hydrocarbon group of 1 to 4 carbon atoms, a monovalent heterogenous group of 1 to 4 carbon atoms, a substituted monovalent hydrocarbon group of 1 to 4 carbon atoms, or a substituted monovalent heterogenous group of 1 to 4 carbon atoms,

R^{13} is not $N(R^9)(OR^9)$ when bond g is a single bond and R^{13} is not NOR^9 when bond g is a double bond, and

R^{13} is not OR^9 when R^{11} is OR^9; M^1, M^2, M^3, and M^4 are each carbon atoms, and R^{12} is a hydrogen atom;

R^{16} is selected from the group consisting of $-CH_2-$, -NH-, and $-NR^{19}-$, wherein R^{19} is selected from the group consisting of hydrocarbon groups, substituted hydrocarbon groups, heterogenous groups, and substituted heterogenous groups; with the proviso that

R^{19} may optionally be bonded together with R^8 to form a ring structure selected from the group consisting of heterocyclic groups and substituted heterocyclic groups;

R^{17} is selected from the group consisting of $-SO_2-$, C(O)-, and $-CH_2-$;

R^{18} is selected from the group consisting of a sulfur atom and $-CH_2-$; and

an optical isomer of the structure described above, a diastereomer of the structure, an enantiomer of the structure, a pharmaceutically-acceptable salt of the structure, a biohydrolyzable amide of the structure, a biohydrolyzable ester of the structure, and a biohydrolyzable imide of the structure; and

(B) a carrier.

35. The composition of claim 34, wherein the carrier is selected from the group consisting of systemic and topical carriers.

36. The composition of claim 35, wherein the systemic carrier comprises one or more ingredients selected from the group consisting of a) diluents, b) lubricants, c) binders, d) disintegrants, e) colorants, f) flavors, g) sweeteners, h) antioxidants, j) preservatives, k) glidants, m) solvents, n) suspending agents, o) wetting agents, p) surfactants, and combinations thereof.

37. The composition of claim 35, wherein the topical carrier comprises one or more ingredients selected from the group consisting of water, alcohols, aloe vera gel, allantoin, glycerin, vitamin A and E oils, mineral oil, propylene glycol, PPG-2 myristyl propionate, dimethyl isosorbide, q) emollients, r) propellants, s) solvents, t) humectants, u) thickeners, v) powders, w) fragrances, x) pigments, y) sugars, z) cellulose or a derivative thereof, aa) a salt, bb) Edetate disodium, cc) a pH adjusting additive, and combinations thereof.

38. A method for treating a condition comprising administering to a subject in need of treatment, a prostaglandin EP_1 agonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of bone disorders, vascular diseases, skin conditions, and sexual dysfunction.

39. A method for treating pain comprising administering to a subject in need of treatment, a prostaglandin EP_1 antagonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of bone disorders, vascular diseases, and sexual dysfunction.

40. A method for treating a condition comprising administering to a subject in need of treatment, a prostaglandin EP_2 agonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of asthma, skin conditions, and bone disorders.

41. A method for treating a condition comprising administering to a subject in need of treatment, a prostaglandin EP_2 antagonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of hypertension and premenstrual tension.

42. A method for treating a condition comprising administering to a subject in need of treatment, a prostaglandin EP_3 agonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of arthritis, vascular disease, hepatic diseases, renal diseases, pancreatitis, mycardial infarct, and gastric disturbances.

43. A method for controlling blood pressure comprising administering to a subject in need of treatment, a prostaglandin EP_3 antagonist comprising a modified α-chain having a phosphinico group at position 2.

44. A method for treating a condition comprising administering to a subject in need of treatment, a prostaglandin EP_4 agonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of arthritis, bone disorders, vascular disease, skin conditions, asthma, hypertension, premenstrual, and glaucoma.

45. A method for treating a condition comprising administering to a subject in need of treatment, a prostaglandin FP agonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of skin disorders, circulatory disorders, gastrointestinal disorders, vascular diseases, and respiratory disorders.

46. A method for preventing premature labor comprising administering to a subject in need of treatment, a prostaglandin FP antagonist comprising a modified α-chain having a phosphinico group at position 2.

47. A method for treating a condition comprising administering to a subject in need of treatment, a prostaglandin IP agonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of vascular disorders and reproductive disorders.

48. A method for treating sleeping disorders comprising administering to a subject in need of treatment, a prostaglandin DP agonist comprising a modified α-chain having a phosphinico group at position 2.

49. A method for treating allergies comprising administering to a subject in need of treatment, a prostaglandin DP antagonist comprising a modified α-chain having a phosphinico group at position 2.

50. A method for treating a condition, comprising administering to a subject in need of treatment, a prostaglandin TP antagonist comprising a modified α-chain having a phosphinico group at position 2, wherein the condition is selected from the group consisting of allergies and vascular disease.